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GUIDE FOR STORAGE OF PEARS

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GUIDE FOR STORAGE OF PEARS

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Indian Standard

GUIDE FOR STORAGE OF PEARS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 31 July 1975, after the draft finalized by the Fruits and Vegetables Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 To ensure fuller utilization of perishable foodstuffs such as fruits and vegetables it is necessary that they should be preserved under conditions so as to maintain their fitness for human consumption over a period of time. Refrigeration is one of the important means to preserve these foodstuffs. For cold storage of various fruits and vegetables on scientific lines, a series of Indian Standard guides based on corresponding ISO Recommendations are being issued. It is hoped that these guides stipulating the conditions to be maintained for different fruits and vegetables would prove to be helpful in better administration of cold storages and in preventing avoidable wastage of fruits.

0.3 In the preparation of this standard, considerable assistance has been drawn from ISO/R 1134-1968 'Guide to cold storage of pears' issued by the International Organization for Standardization.

0.4 This Institution had earlier issued IS : 7252-1974* which prescribes definitions and information concerning measurement of physical factors in cold stores.

1. SCOPE

1.1 This standard describes methods for obtaining conditions for the successful storage of pears.

2. CONDITIONS OF HARVESTING AND PUTTING INTO STORAGE

2.1 Harvesting

2.1.1 The practical criteria of maturity most frequently used for defining the best time for harvesting may be as given below :

- a) The basic colour of the outer skin;

NOTE — The basic ground colour should be distinguished from the red anthocyanin pigmentation, the intensity and extent of which vary according to the variety and, to some extent, with the exposure to sunlight.

*Guide for testing of physical conditions in cold stores.

- b) The age of fruits, expressed as the number of days that have elapsed since full flowing;
- c) The hardness of the flesh, when estimated by means of a spring penetrometer should not be less than 100 kN/m^2 **;
- d) The ease of picking; and
- e) Total soluble solids determined by refractometer.

2.1.2 These criteria may not be universally valid for a given variety but may vary from one region to another. The grower may decide on his own criteria from those mentioned above for picking, on the basis of experience.

2.1.3 Exact timing of the date of harvesting should be more important for early varieties than for late varieties.

2.1.4 Fixing of time of harvesting should have greater importance for controlled-atmosphere storage than for storage in air.

2.2 Quality Characteristics for Storage — Fruit put into cold storage should be sound, free from bruises or physiological disorders and free from any visible sign of fungal or bacterial attack. It should be clean and dry.

2.3 Putting into Storage — The fruit should be put into the cold store as soon as possible after harvesting preferably after precooling. The temperature of the fruit should be lowered to a value suitable for the variety within four days. For achieving this, large quantities of cold air should be circulated in the cold storage room.

2.4 Method of Storage — The fruit should be handled with care. The packages should allow free circulation of air. Storage densities of about 200 kg per cubic metre of usable space are recommended.

2.4.1 When the fruits are stored in pellets, the storage density may be increased by 10 to 20 percent.

3. OPTIMAL CONDITIONS OF STORAGE

3.1 Temperature

3.1.1 Pears should be kept at as low a temperature as possible, subject only to avoiding the risk of freezing. In general, the best results are obtained at -1 to $+0.5^\circ\text{C}$.

3.1.2 A difference of 1°C in storage temperature has a profound effect on the time for which the pears can be kept. It has been shown that during cold storage the freezing point of the fruit falls slightly.

*Equivalent to 1.0197 kgf/cm^2 or 1 bar or 14.5 lbf/in^2 .

3.1.3 The course of development of the fruit during storage depends on the choice of storage temperature. When the temperature of the cold store is low (0°C , -1°C) the pears change very little during their storage period in the cold store and it is necessary to submit them to a complementary ripening process at a higher temperature when they leave the cold store.

3.1.4 Some varieties ripen completely at higher temperatures only if the preliminary period at low temperature has not been too long (for example Williams' Bon Chretien, Kashmiri Nakh and Chinese Sandy Pear).

3.1.5 An accidental rise in storage temperature can initiate ripening, hence while putting fresh fruits lots in cold store, loading arrangement should be such that it does not elevate the temperature more than 2°C .

3.1.6 Certain varieties do not withstand cold conditions well, and storing them at low temperature is sometimes responsible for the appearance of more or less widespread internal browning.

3.1.7 The recommended temperatures for a few varieties are given in Table 1.

TABLE 1 RECOMMENDED TEMPERATURES

SL No.	VARIETY	RECOMMENDED TEMPERATURE	EXPECTED STORAGE LIFE	GENERAL REMARKS
(1)	(2)	(3)	(4)	(5)
		$^{\circ}\text{C}$		
i)	Williams' Bon Chretien	-1 to 0	9 to 11 weeks	a) Complimentary ripening necessary b) Susceptible to scald c) Ripens between $+10^{\circ}\text{C}$ and 24°C only
ii)	Beurre Hardy	0	3 to 5 months	Complimentary ripening necessary
iii)	Conference	-1 to 0	6 to 7 months	—
iv)	Keiffer	-1 to 0	$2\frac{1}{2}$ to 3 months	—
v)	Winter nelis	-1 to 0	6 to 7 months	—

3.2 Relative Humidity — Pears may generally be stored at a relative humidity between 90 to 95 percent. If the atmosphere is drier, the fruit develops a stronger taste and aroma, but losses in mass are greater.

3.3 Air Circulation — Periodical changes of the atmosphere is advisable for varieties sensitive to scald.

3.4 Storage Life

3.4.1 The expected storage life for a few varieties is given in Table 1.

3.4.2 Storage should not be prolonged beyond limits compatible with the maintenance of good quality.

3.4.3 Samples of fruit should be drawn regularly in such a way as to detect the appearance of any wastage.

3.5 Operations at the End of Storage — The varieties which should undergo a complementary ripening after cold storage are indicated in Table 1.

INDIAN STANDARDS

ON

FRUITS AND VEGETABLES

IS :

2773-1964 Cauliflower
2774-1964 Cabbage
2775-1964 Carrots
2776-1964 Brinjals (Egg plant)
2777-1964 Peas-in-pods
2778-1964 Tomatoes
3197-1965 Onions
3240-1965 Garlic
3570-1965 Nomenclature of fruits
3712-1966 Radish
3713-1966 Knol khol
3718-1966 Limes, fresh
3728-1966 Wooden boxes for packaging of apples
3801-1966 Guavas
4232-1967 Turnip
4233-1967 Beets
4234-1967 Sweet potato
4235-1967 Chillies, fresh
4243-1967 Mandarins
6028-1971 Guide for storage and transport of green bananas
6669-1972 Guide for storage of apples
6670-1972 Guide for storage of potatoes
7191-1974 Guide for storage of tomatoes
7192-1974 Guide for storage of citrus fruits
7252-1974 Testing of physical conditions in cold stores
7470-1974 Nomenclature of vegetables
7731-1975 Guide for storage of peaches

INDIAN STANDARDS INSTITUTION

Manek Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110001

Telephone : 27 01 31 (20 lines)

Telegrams : Manaksanstha

Regional Offices :

Western : Novelty Chambers, Grant Road
Eastern : 5 Chowringee Approach
Southern : 54 General Patters Road

	Telephone
BOMBAY 400007	37 97 29
CALCUTTA 700072	23-08 02
MADRAS 600002	8 37 81

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur
'F' Block, Unity Bldg, Narasimharaja Square
Kothi No. 90, Sector 18A
5-8-56/57 Nampally Station Road
117/418 B Sarvodaya Nagar
B.C.I. Bldg (Third Floor), Gandhi Maidan East

	Telephone
AHMEDABAD 380001	2 03 91
BANGALORE 560002	2 76 49
CHANDIGARH	2 83 20
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